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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.				
10/743,172	12/22/2003	Kenichi Kawase	112857-453	7752				
29175 K&L Gates LLP P. O. BOX 1135 CHICAGO, IL 60690	7590 02/22/2010		<table border="1"><tr><td>EXAMINER</td></tr><tr><td>LEE, CYNTHIA K</td></tr></table>		EXAMINER	LEE, CYNTHIA K		
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			<table border="1"><tr><td>NOTIFICATION DATE</td><td>DELIVERY MODE</td></tr><tr><td>02/22/2010</td><td>ELECTRONIC</td></tr></table>	NOTIFICATION DATE	DELIVERY MODE	02/22/2010	ELECTRONIC	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

### Office Action Summary

**Application No.**

10/743,172

**Applicant(s)**

KAWASE ET AL.

**Examiner**

CYNTHIA LEE

**Art Unit**

1795

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6-12 and 14-21 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-4, 6-8, 10-12 and 14-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Response to Amendment***

This Office Action is responsive to the amendment filed on 10/22/2009. Claims 1-4,6-12,14-21 are pending. Claims 1 and 9 are withdrawn from further consideration as being drawn to a non-elected invention. Applicant's arguments have been fully considered. Claims 2-4,6-8,10-12,14-21 are finally rejected for reasons stated herein below.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2-4,6-8,10-12,14-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claims 2 and 10, the limitation "a particle projecting from a substrate" (emphasis added) is not supported by the disclosure as originally filed. Although Applicants rely on projections 11B on fig. 2 for support, neither the Specification nor the drawings support that a projection is formed from "a particle."

Applicants are required to cancel the new matter in reply to this Office Action.

*Applicant argues that pgs 6 and 7 support the newly added limitation above.* In response, it is noted that, for example, pg 6 line 30 states that the projection 11B is a "particle shape" and not "a particle". Thus, the rejection is maintained.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-4,6-8,10-12,14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akagi et al. (JP 11-135115) in view of Fujimoto et al. (US 2004/0224231 A1), as evidenced by Asahina (US 2007/0275301).

With respect to claims 2-4,8,10-12,14,16, Akagi et al. teach a lithium secondary battery, wherein an anode comprising a current collector and a silicon thin film is deposited on the current collector by using an RF sputtering technique. The resulting anode is heat treated under vacuum. See paragraph 5-8. However, Akagi et al. do not teach the use of a current collector having projections. Fujimoto et al. teach a lithium secondary battery, wherein the projections on the copper collector would help accommodate a change in volume of the active material when it expands and shrinks during charge and discharge. See paragraphs 50,83. With respect to claims 2 and 10, Fujimoto et al. teach the surface roughness of the copper foil with particles of Example

1 is 5.99  $\mu\text{m}$ . The surface roughness alone is 4.10  $\mu\text{m}$ . See Table 1. The surface roughness  $R_y$  is the maximum height. See Asahina (US 2007/0275301) [0012]. It is concluded that the copper particle size is  $5.99 - 4.10 = 1.89 \mu\text{m}$ . It has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to form projections in the current collector of Akagi using the method of Fujimoto, because Fujimoto et al. teach the projections on the copper collector help accommodate the change in volume of the active material during charge and discharge cycles.

Moreover, Akagi and Fujimoto do not specifically disclose the silicon thin film alloys with the copper current collector. However, it is the position of the examiner that such properties are inherent, given that both Akagi et al. and the present application utilize the same processing procedures and thermal treatment. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 6, 7, 15, Fujimoto et al. teach an electrolytic deposition of copper particles on the copper current collector. See paragraph 50.

With respect to claims 17, 18, Akagi et al. teach the lithium rechargeable battery comprising the use of carbonates as solvent the use of lithium salts as the electrolyte salt. See paragraph 10.

With respect to claim 19, Akagi et al. teach the use of  $\text{LiCoO}_2$  as the cathode active material. See paragraph 9.

Regarding the size of the particle projection of claims 1, 10, 20, and 21, another interpretation of Fujimoto is taken. Referring to Table 1, the thickness of substrate a (copper particles deposited on surface-roughened copper foil) has a thickness of 26  $\mu\text{m}$ . The thickness of substrate c (only a surface-roughened copper foil) has a thickness of 21  $\mu\text{m}$ . It is noted that the diameter of the particles is 5  $\mu\text{m}$ . Further, referring to Table 4, the thickness of the surface-roughened Corson alloy foil has a thickness of 19.5  $\mu\text{m}$ . By adding copper particles onto the surface-roughened Corson alloy foil, the thickness was 23.2  $\mu\text{m}$  [0090]. It is noted that the diameter of the particles is 3.7  $\mu\text{m}$ .

6. Claims 2-4,6-8,10-12,14-16,18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neudecker et al. (US 6,242,132 B1) in view of Fujimoto et al. (US 2004/0224231 A1), as evidenced by Asahina (US 2007/0275301).

With respect to claims 2-4,8,10-12,14,16,18, Neudecker et al. teach a lithium secondary battery, wherein an anode comprising a current collector and a silicon-tin oxynitride film is deposited on a heated current collector by using an electron beam

evaporation technique. See Column 7, Lines 1-43. However, Neudecker et al. do not teach the use of a current collector having projections. Fujimoto et al. teach a lithium secondary battery, wherein the projections on the copper collector would help accommodate a change in volume of the active material when it expands and shrinks during charge and discharge. See paragraphs 50,83. With respect to claims 2 and 10, Fujimoto et al. teach the surface roughness of the copper foil with particles of Example 1 is 5.99  $\mu\text{m}$ . The surface roughness alone is 4.10  $\mu\text{m}$ . See Table 1. The surface roughness  $R_y$  is the maximum height. See Asahina (US 2007/0275301) [0012]. It is concluded that the copper particle size is  $5.99-4.10 = 1.89 \mu\text{m}$ . It has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to form projections in the current collector of Neudecker using the method of Fujimoto, because Fujimoto et al. teach the projections on the copper collector help accommodate the change in volume of the active material during charge and discharge cycles.

Moreover, Neudecker and Fujimoto do not specifically disclose the silicon thin film alloys with the copper current collector. However, it is the position of the examiner that such properties are inherent, given that both Akagi et al. and the present application utilize the same processing procedures. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is*

*necessarily present in that which is described in the reference. In re Robertson*, 49 USPQ2d 1949 (1999).

With respect to claims 6,7,15, Fujimoto et al. teach an electrolytic deposition of copper particles on the copper current collector. See paragraph 50.

With respect to claim 19, Neudecker et al. teach the use of  $\text{LiCoO}_2$  as the cathode active material. See Figure 4.

Regarding the size of the particle projection of claims 1, 10, 20, and 21, another interpretation of Fujimoto is taken. Referring to Table 1, the thickness of substrate a (copper particles deposited on surface-roughened copper foil) has a thickness of 26  $\mu\text{m}$ . The thickness of substrate c (only a surface-roughened copper foil) has a thickness of 21  $\mu\text{m}$ . It is noted that the diameter of the particles on substrate a is 5  $\mu\text{m}$ . Further, referring to Table 4, the thickness of the surface-roughened Corson alloy foil has a thickness of 19.5  $\mu\text{m}$ . By adding copper particles onto the surface-roughened Corson alloy foil, the thickness was 23.2  $\mu\text{m}$  [0090]. It is noted that the diameter of the particles surface-roughened Corson alloy foil is 3.7  $\mu\text{m}$ .

### ***Response to Arguments***

Applicant's arguments filed 10/22/2009 have been fully considered but they are not persuasive.

*Applicant refers to Table 3 of the instant Specification and argues the critical nature of the claimed range.*



Referring to Table 3, it is noted that the roughness of 1.89 of Fujimoto would perform as well, if not better, in capacity retention ratio than the average projection diameter of 10  $\mu\text{m}$ . Thus, the projection diameter of the claimed range is found obvious in view of Fujimoto.

Regarding the new claims 20 and 21, Applicant is referred to the rejections above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/  
Examiner, Art Unit 1795

/PATRICK RYAN/  
Supervisory Patent Examiner, Art  
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